

**REMARKS**

Claims 1-12 are currently pending in the subject application, and are presently under consideration. Claims 1-12 are rejected. Claims 6 and 12 have been amended. Favorable reconsideration of the application is requested in view of the amendments and comments herein.

**I. Rejection of Claims 6 and 12 Under 35 U.S.C. §112, First Paragraph**

Claims 6 and 12 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement, and under 35 U.S.C. §112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention, and as being indefinite. Withdrawal of this rejection is respectfully requested for at least the following reasons.

In the Office Action dated May 3, 2007 (hereinafter "Office Action"), the Examiner asserts that claims 6 and 12 are non-enabling. Particularly, the Examiner states that "[c]laims 6 and 12 are directed to beam steering (FIG. 1) and frequency selection (FIG. 4), which are two different embodiments," (Office Action, page 2). Representative for Applicant respectfully agrees that claims 6 and 12 are directed to both beam steering and frequency selection. However, Representative for Applicant respectfully submits that beam steering and frequency selection, as described in the Present Application, are not mutually exclusive embodiments, such beam steering and frequency selection can be implemented together. Therefore, Representative for Applicant respectfully submits that the rejection of claims 6 and 12 under 35 U.S.C. §112, first paragraph, is improper.

In the Specification, the Present Application states that "the invention allows UWB pulses to be directed to selected multiple users, using *a selected combination* of spatial beam separation, temporal separation and frequency reuse," (Present Application, paragraph 6; emphasis added). That the Present Application specifically states that UWB pulses can be directed to multiple users based on a combination of the claimed elements indicates that the embodiments described are not mutually exclusive. In addition, the Present Application states that "[i]n addition to spatially multiplexing pulses, time multiplexing can be used," (Present

Application, paragraph 15). This passage thus indicates that the described embodiments of spatial multiplexing (*i.e.*, beam steering) and time slot reuse are not mutually exclusive, thus further indicating that separate embodiments, as described in the Present Application, can be implemented together.

In addition, the Present Application states "separating UWB pulses into individual user streams is effected by assigning to each user a unique combination of a UWB frequency and an antenna array," (Present Application, paragraph 5). Furthermore, in describing the frequency selection embodiment of FIG. 4, the Present Application states that "a three-array antenna is designed to generate three spatially separated beams from each of its three arrays," and further states that, "[u]sing this configuration, pulses for all nine users may overlap in time because they are separated spatially and by frequency at the antenna arrays," (Present Application, paragraph 16). The antenna arrays described in FIG. 4 of the Present Application correspond to that described in FIG. 1 of the Present Application, which the Examiner has conceded through her own admission as describing beam steering (Office Action, page 2; see also Present Application, paragraphs 13 and 16). Therefore, the Present Application clearly describes that the embodiment of FIG. 4 implements both beam steering and frequency selection, which are both recited in claims 6 and 12. Accordingly, the rejection of claims 6 and 12 under 35 U.S.C. §112, first paragraph, is improper, as beam steering and frequency selection are not mutually exclusive embodiments that would render claims 6 and 12 non-enabling.

The Examiner also asserts that claims 6 and 12 do not set forth the subject matter which applicant(s) regard as their invention (Office Action, page 3). Particularly, the Examiner cites the Present Application that states that "[i]nstead of time reuse to identify particular pulses as being associated with particular users, the system may employ frequency reuse to separate the users," and asserts that "this statement indicates that the invention is different from what is defined in the claims because beam steering, time slot reuse, and frequency reuse are different embodiments," (Office Action, page 3; citing Present Application, paragraph 16).

Representative for Applicant respectfully submits that the citation from the Present Application is misplaced. Specifically, the Examiner concedes through her own admission that

claims 6 and 12 are directed to both beam steering and frequency selection (Office Action, page 2). Claims 6 and 12 are not, however, directed to time slot reuse, nor are any of the claims from which claims 6 and 12 respectively depend. Therefore, even assuming *arguendo* that time slot reuse and frequency selection are mutually exclusive embodiments, such a determination that claims 6 and 12 do not set forth the subject matter which applicant(s) regard as their invention based on such mutually exclusive embodiments is improper, as claims 6 and 12 do not recite time slot reuse. Instead, claims 6 and 12 recite beam steering and frequency reuse, which as described above, are not mutually exclusive embodiments. Accordingly, the rejection of claims 6 and 12 under 35 U.S.C. §112, second paragraph, is improper because claims 6 and 12 do not recite time slot reuse and because beam steering and frequency selection are not mutually exclusive embodiments.

With regard to claims 6 and 12 being indefinite, claims 6 and 12 have been amended to clarify the lack of antecedent basis of "frequencies." Therefore, for all of the reasons described above, claims 6 and 12 should now be in compliance with 35 U.S.C. §112, first and second paragraphs. Withdrawal of the rejection of claims 6 and 12 under 35 U.S.C. §112 is respectfully requested.

## **II. Rejection of Claims 1-5 and 7-11 Under 35 U.S.C. §102(b)**

Claims 1-5 and 7-11 stand rejected under 35 U.S.C. §102(b) as being anticipated by Applicant Admitted Prior Art (AAPA), U.S. Patent No. 5,907,816 to Newman, et al. ("Newman"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claim 1 recites an apparatus capable of directing selected UWB pulses to and from selected multiple users, and means for separating UWB pulses into individual user streams of pulses and applying each user stream to the antenna structure in such a way as to generate individual user beams containing only pulses intended for those respective users. In the Office Action, the Examiner asserts that the radio communication system of Newman is equivalent to a

UWB communication system (Office Action, page 4). Representative for Applicant respectfully disagrees.

The Present Application provides significant description as to ultra-wideband (UWB) communications, in that UWB communications is a type of radio communication that implements radio pulses that do not contain a carrier signal (see, *e.g.*, Present Application, paragraphs 1 and 2). The system of Newman is completely silent as to the use of UWB communications. Representative for Applicant thus respectfully submits that it is improper to assert that Newman teaches UWB communications based merely on a teaching of a radio communication system. Specifically, Newman does not teach an apparatus capable of directing selected UWB pulses to and from selected multiple users, and means for separating UWB pulses into individual user streams of pulses, as recited in claim 1. Therefore, Newman does not teach each and every element of claim 1.

In addition, Newman discloses that a controller provides switching selection signals to a switching device to couple an output port to a beam signal on a specific antenna (Newman, col. 5, ll. 48-53). Therefore, even assuming *arguendo* that Newman can be considered to teach a UWB communication system that implements UWB pulses, Newman does not teach separating UWB pulses into individual user streams of pulses and applying each user stream to the antenna structure, as recited in claim 1. Instead, the system of Newman routes signals from the antenna structure, and does not apply them to the antenna structure. Furthermore, Newman discloses that "[s]uch selection basis may comprise selection of the beam signal having the highest user signal amplitude, or the best signal to spurious signal ratio, relative to the other three first antenna beam signals, for the particular user signal of interest at that time," (Newman, col. 5, ll. 59-63). Thus, the purpose of the switching of the signal from one antenna to another, as described in Newman, is to obtain better signal quality, and not to generate individual user beams. Therefore, the switching system of Newman is not directed to separating signals into individual user streams of pulses and applying each user stream to the antenna structure in such a way as to generate individual user beams containing only pulses intended for those respective users, as recited in claim 1.

For all of these reasons, Newman does not teach each and every element of claim 1, and thus does not anticipate claim 1. Withdrawal of the rejection of claim 1, as well as claims 2-6 which depend therefrom, is respectfully requested.

Claim 2 recites means for assigning to each user a particular allocation of UWB time slots. As described above, Newman does not teach a UWB communication system. Therefore, Newman does not teach means for assigning to each user a particular allocation of UWB time slots, as recited in claim 2. Withdrawal of the rejection of claim 2 is respectfully requested.

Claim 3 recites means for applying each user stream to a different segment of the antenna. The Examiner asserts that Newman teaches claim 3 based on the multi-beam antennas described in FIG. 1 (Office Action, page 4). Representative for Applicant respectfully disagrees. As described above, Newman discloses that the switching between antennas is based on the highest user signal amplitude, or the best signal to spurious signal ratio, relative to the other three first antenna beam signals, for the particular user signal of interest at that time (Newman, Newman, col. 5, ll. 59-63). Newman also discloses that if the user changes position or environmental signal transmission conditions change, so that better coverage of the new position of the user is provided by one of the other beams of antenna, signals from that beam will be coupled to receiver system (Newman, col. 6, ll. 6-11). Therefore, Newman discloses selection of a beam from an antenna for the same signal of a given one user. Accordingly, Newman does not teach means for applying each user stream to a different segment of the antenna, as recited in claim 3. Withdrawal of the rejection of claim 3 is respectfully requested.

Claim 5 recites a plurality of beam forming networks, each associated with a separate one of the multiple antenna arrays, and each comprising a plurality of variable time delay circuits, wherein the time delay circuits interpose different sets of selected time delays for UWB pulses applied to the successive array elements, to direct different pulses along beam paths to respective users. The Examiner asserts that Newman teaches a plurality of beam forming networks based on the antenna system 10 in FIG. 1 (Office Action, page 5). Representative for Applicant respectfully submits that the antenna system 10 in FIG. 1 of Newman is a single "network", and not a plurality of networks as recited in claim 5 (see, e.g., Newman, FIG. 1; col. 4, ll. 5-41).

Specifically, claim 5 recites that each antenna array has a separate associated network, contrary to the single antenna system of Newman that is specific to multiple antennas. Furthermore, Newman discloses a receiver system that receives signals at the respective antennas (Newman, col. 4, ll. 5-9). Therefore, the system of Newman does not form beams, but instead receives beams. Accordingly, Newman does not teach a plurality of beam forming networks, each associated with a separate one of the multiple antenna arrays, as recited in claim 5.

In addition, the Examiner asserts that Newman teaches variable time delay circuits based on reference numbers 27-31 and 27a-31a in FIG. 1. Representative for Applicant respectfully disagrees. The cited reference numbers of Newman are not variable time delay circuits, but are instead multicoupler means that are respectively coupled to each of the beam ports (Newman, col. 4, ll. 63-65). Newman also discloses that the multicoupler means make each of the first antenna beam signals provided at the beam ports available at a plurality of three parallel ports (Newman, col. 4, line 65 through col. 5, line 1). Therefore, the cited devices are beam splitters, and are not variable time delay circuits. Furthermore, Representative for Applicant respectfully submits that Newman is completely silent as to signal time delay, and thus does not teach comprising a plurality of variable time delay circuits, wherein the time delay circuits interpose different sets of selected time delays for UWB pulses applied to the successive array elements, to direct different pulses along beam paths to respective users, as recited in claim 5.

Furthermore, claim 5 recites means for generating beam steering signals to the beam forming networks, to switch the beam forming networks to effect beam steering toward selected users served by each antenna array. The Examiner asserts that Newman teaches this element of claim 5 based on the switching signals provided from the controller (Office Action, page 5; citing Newman, FIG. 1, reference numbers 40, 33-35, and 33a-35a). Representative for Applicant respectfully disagrees. As described above, Newman discloses a receiver system that receives user signals (Newman, col. 4, ll. 5-9), and thus does not teach beam forming. Therefore, Newman likewise does not teach beam steering, as Newman merely discloses switching a signal that is received at different antennas to a receive port (Newman, col. 5, ll. 48-53). Thus, there is no beam steering effectuated, such that a beam is directionally steered, in the

disclosure of Newman. Accordingly, Newman does not anticipate claim 5. Withdrawal of the rejection of claim 5, as well as claim 6 which depends therefrom, is respectfully requested.

Claims 7-11 are method claims that recite substantially the same elements as claims 1-5, respectively. Therefore, for substantially the same reasons as described above regarding claim 1, claim 7 should be allowed over the cited art. Likewise, for substantially the same reasons as described above regarding claims 2, 3, and 5, claims 8, 9, and 11, respectively, should be allowed over the cited art. Withdrawal of the rejection of claim 7, as well as claims 8-12 which depend therefrom, is respectfully requested.

For the reasons described above, claims 1-5 and 7-11 should be patentable over the cited art. Accordingly, withdrawal of this rejection is respectfully requested.

### **III. Rejection of Claims 6 and 12 Under 35 U.S.C. §103(a)**

Claims 6 and 12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Newman in view of U.S. Publication No. 2005/0207505 to Lakkis ("Lakkis"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claim 6 depends from claim 1. As described above, Newman does not teach the elements of claim 1, and thus does not anticipate claim 1, from which claim 6 depends. The addition of Lakkis does not cure the above described deficiencies of Newman to teach or suggest claim 1. Therefore, claim 6, which depends from claim 1, should be allowed over the cited art.

Furthermore, claim 6 recites each beam forming network is switchable to direct beams to a plurality (m) of users associated with each antenna array, and that the antenna structure has n arrays, for a total of mn users. The Examiner asserts that Newman teaches this element of claim 6 based on the antennas 20 and 20a and the switches 33-35 and 33-35a (Office Action, page 7; citing Newman, FIG. 1; reference numbers 20 and 20a, 33-35 and 33-35a). Representative for Applicant respectfully disagrees. As described above, Newman discloses that a controller provides switching selection signals to a switching device to couple an output port to a beam signal on a specific antenna, and that the selection basis may include selection of the beam signal having the highest user signal amplitude, or the best signal to spurious signal ratio, relative to the

other three first antenna beam signals, for the particular user signal of interest at that time (Newman, col. 5, ll. 48-63). Therefore, Newman provides no teaching that the separate beam signals at a given one of the antenna elements correspond in number respectively to a number of users. In addition, Newman discloses that the two four-beam antennas are laterally spaced to each provide full coverage of a sector to provide spatial diversity reception for each user position in a sector. Therefore, the separate four-beam antenna elements 20 and 20a likewise do not respectively correspond to separate users, but instead provide spatial reception diversity for all positions in a given area. Accordingly, Newman does not teach that each beam forming network is switchable to direct beams to a plurality (m) of users associated with each antenna array, and that the antenna structure has n arrays, for a total of mn users, as recited in claim 6.

Claim 6 also recites that the UWB pulses for each of the mn users have a carrier frequency selected from a plurality of available frequencies, and the plurality of available frequencies are reused in a spatial sequence such that the beam associated with any user is spatially separated from other user beams using the same frequency. The Examiner relies on Lakkis to teach this element of claim 6. However, Lakkis does not cure the deficiencies of Newman to teach or suggest the elements of claim 6. Furthermore, Lakkis does not teach or suggest the UWB pulses in a communication system. Therefore, neither Newman nor Lakkis, individually or in combination, teach or suggest claim 6. Withdrawal of the rejection of claim 6 is respectfully requested.

Claim 12 is a method claim that recites substantially the same elements as claim 6. Therefore, for substantially the same reasons as described above regarding claim 6, neither Newman nor Lakkis, individually or in combination, teach or suggest claim 12. Withdrawal of the rejection of claim 12 is respectfully requested.

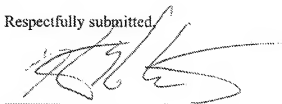
**CONCLUSION**

In view of the foregoing remarks, Applicant respectfully submits that the present application is in condition for allowance. Applicant respectfully requests reconsideration of this application and that the application be passed to issue.

Please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Date 11/5/07

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